

06/07/00
JC803 U.S. PTO

Patent
Attorney's Docket No. 032292-020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

UTILITY PATENT
APPLICATION TRANSMITTAL LETTER

JCE32 U.S. PTO
09/588598
06/07/00

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Enclosed for filing is the utility patent application of Erik A. COLBAN for FACSIMILE SERVICES IN MOBILE NETWORKS.

Also enclosed are:

- ☒ 1 sheet(s) of ☒ formal ☐ informal drawing(s);
- ☒ a claim for foreign priority under 35 U.S.C. §§ 119 and/or 365 is ☐ hereby made to filed in on ;
☒ in the declaration;
- ☐ a certified copy of the priority document;
- ☐ a General Authorization for Petitions for Extensions of Time and Payment of Fees;
- ☐ statement(s) claiming small entity status;
- ☐ an Assignment document;
- ☐ an Information Disclosure Statement; and
- ☒ Other: Preliminary Amendment
- ☒ An ☐ executed ☒ unexecuted declaration of the inventor(s)
☒ also is enclosed ☐ will follow.
- ☒ Please amend the specification by inserting before the first line the sentence --This application claims priority under 35 U.S.C. §§119 and/or 365 to 19992775 filed in Norway on June 8, 1999; the entire content of which is hereby incorporated by reference.--
- ☐ A bibliographic data entry sheet is enclosed.



21839

☒ The filing fee has been calculated as follows ☒ and in accordance with the enclosed preliminary amendment:

CLAIMS					
	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEE
Basic Application Fee					\$690.00 (101)
Total Claims	15	MINUS 20 =	-0-	x \$18.00 (103)	-0-
Independent Claims	2	MINUS 3 =	-0-	x \$78.00 (102)	-0-
If multiple dependent claims are presented, add \$260.00 (104)					---
Total Application Fee					690.00
If verified Statement claiming small entity status is enclosed, subtract 50% of Total Application Fee					---
Add Assignment Recording Fee if Assignment document is enclosed					-0-
TOTAL APPLICATION FEE DUE					690.00

- ☐ This application is being filed without a filing fee. Issuance of a Notice to File Missing Parts of Application is respectfully requested.
- ☒ A check in the amount of \$ 690.00 is enclosed for the fee due.
- ☐ Charge \$ _____ to Deposit Account No. 02-4800 for the fee due.
- ☒ The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800. This paper is submitted in duplicate.

Please address all correspondence concerning the present application to:

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Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: June 7, 2000

By: 

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
)
Erik A. COLBAN) Group Art Unit: Unassigned
)
Application No.: Unassigned) Examiner: Unassigned
)
Filed: June 7, 2000)
)
For: FACSIMILE SERVICES IN MOBILE)
NETWORKS)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend claims 3, 7, 9 - 11 as follows:

Claim 3, line 1, delete "or 2".

Claim 7, line 1, delete "or 6".

Claim 9, line 1, delete "or 8".

Claim 10, line 1, delete "any of the claims 5-9" and insert therefor --claim 5--.

Claim 11, lines 1 and 2, delete "any of the claims 5-10" and insert therefor
--claim 5--.

REMARKS

The above amendments to the claims have been made in order to eliminate multiple dependencies. Favorable action on the merits of the application is respectfully requested.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: St. M. de la Cruz

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Date: June 7, 2000

FACSIMILE SERVICES IN MOBILE NETWORKS

TECHNICAL BACKGROUND

5 THE PROBLEM AREA

Problems with facsimile services in mobile networks are experienced due to the quality of the radio transmission. Longer delays and higher bit error rates than in the PSTN
10 (Public Switched Telephone Network) cause facsimile transactions to fail more frequently in a mobile environment than in the PSTN. There are ways to avoid some of these failures, but which methods are the best is a subject for debate. The problem is to find a common
15 platform to be standardised that will enable diverse competing solutions to be applied.

PRIOR ART

20 Facsimile services can be divided into two main categories. One is where the facsimile messages are both transmitted and acknowledged within one session. This kind of services is referred to as real-time fax. Another category is so called store-and-forward fax, where the facsimile is stored
25 in a fax-box and transmitted to or from the mobile user by use of a file or message transfer program, for instance, e-mail.

The latter category lacks the feature of "immediate
30 delivery", which in many occasions is seen as quite desirable, and therefor fails to meet a requirement that is often exhibited. This category will not be considered further in this document.

35 There are various standardised solutions for real-time fax in mobile networks. In GSM, there are two; a transparent and a non-transparent fax service. Although both have been standardised, the non-transparent service is not in use

because the transactions often fail. For this reason, the transparent fax solution is applied in GSM. However, in the PDC networks in Japan, a non-transparent fax serviced is used, which may be due to a better fax service

5 specification in PDC than in GSM. Several actors in the PDC market have proposed to produced an enhanced version of the GSM non-transparent fax service specification for the 3rd generation mobile networks. The enhancements are to be based on the PDC standard.

10

In the Internet community, facsimile transmission over IP (Internet Protocol), usually referred to as IPfax, has been standardised. There are IPfax solutions for both real-time and store-and-forward. In ITU-T (International Telecom-

15 munication Union), these solutions have been captured in the T.38 and T.37 Recommendations respectively.

The T.38 recommendations specifies how the messages of the PSTN fax protocols (T.30 and T.4) are to be mapped onto IP.

20 Delays occur in IP networks due to congestion. T.38 does not specify how these delays are to be handled for successful delivery of facsimiles; this is left to implementation. T.38 has therefore the wanted characteristics of a standard that allows competing

25 solutions to evolve.

PROBLEMS WITH KNOWN SOLUTIONS

All fax service specifications for mobile networks, either

30 for GSM or PDC or other, are very specific and constrain which solutions are possible. On one hand this has the advantage that the necessary software and hardware one the mobile side and that on the network side, can be provided independently yet allowing interoperability. On the other

35 hand, any defects in the standards will penetrate all implementations of them and even small improvements may necessitate changes in the standards.

The real-time IPfax solutions apply to IP and it is currently not straight-forward to apply them to mobile networks. Real-time IPfax, does not specify how to handle delays in the IP network or high bit error rates. Moreover, IPfax does not specify how a mobile terminated call can be accomplished, since there are addressing issues to be solved.

THE INVENTION

10

SUMMARY OF THE INVENTION

The problems with the prior art solutions mentioned above is solved in a fax solution for mobile networks according to the present invention. According to the invention there is introduced an additional layer in the network for transporting fax messages. The additional layer is based on known IP protocols for fax transfer.

The advantage of this solution is that the fax transport protocol is tightly specified in the T.38 recommendation, which is an accepted standard, while the transfer mechanisms in the deeper layers are left to the preferences of the service provider. Users can easily adapt to different service providers.

The exact scope of the present invention is defined in the appended patent claims.

DRAWINGS

Figure 1 illustrates the architecture and protocol stack for real-time facsimile service according to the present invention.

35

Figure 2 illustrates an embodiment of the present invention where the fax gateway is separated from MSC by an IP network.

DETAILED DESCRIPTION OF THE INVENTION

The invention is of a fax service for mobile networks where
5 the messages of the fax protocol (T.4 and T.30) are
transported over an IP layer in the mobile network. The
ITU-T T.38 protocol specifies how T.30 and T.40 is
transported over the IP layer. The principles for
overcoming long delays and errors described in GSM
10 Technical Specification 03.46 (Non-transparent facsimile),
or any enhancement thereof, are applied. Other
implementation specific mechanisms can also be applied.
These mechanisms are henceforth referenced in this document
as 03.46+. The actual mechanisms of 03.46+ are out of the
15 scope of this invention. The invention's core idea is to
map the facsimile messages onto TCP or UDP packets and, in
turn, map these packets onto the Radio Link Protocol (RLP)
frames according to T.38, instead of mapping them directly
onto RLP frames. TCP/IP header compression can be applied
20 in order to reduce overhead. Figure 1 illustrates the
protocol stack.

Call set-up and call control procedures are according to
the protocol for existing data and fax services in the
25 mobile network.

The terminal has two internal interfaces. First there is
the interface between the Fax and the Adapter allowing a
standard fax machine to be attached to the terminal. The
30 other internal interface is between the "phone" and the
adapter. This is an asynchronous (V.24) interface allowing
transport of IP packets. The Fax and the adapter can be
bundled into one product, a so-called Internet Aware
Facsimile Device (IAFD), either as a special purpose fax
35 machine or as a PC-like device. In case of a PC device, the
adapter may be in form of downloadable software.

The adapter in the terminal and the fax gateway in the IWF are peers. (The Fax GW could alternatively have been called an adapter. Fax GW is chosen here to be compliant with T.38 terminology.) The 03.46+ is applied between the two peers.

- 5 Note that, when 03.46+ maps fax protocol messages onto IP, it becomes an instance of T.38.

- The 03.46+ protocol would specify how to handle delays and high error bit rates, and call set-up is not a problem
 10 either, since the call set-up procedure for fax calls in GSM or the actual mobile network can be applied. Therefore, 03.46+ and T.38 can be said to complement each other.

ADVANTAGES

15

An immediate advantage is that a split in the market, where irreconcilable solutions for fax in mobile networks may appear, can be avoided. If different solutions for the 03.46+ are implemented, users may easily adjust their

20

equipment to different service providers by downloading the required adapter software (this applies to the case where the IAFD is a PC-like device). Another benefit is that the Fax Gateway could easily (once the addressing issues are solved) be moved across an IP network, as shown in Figure

25

2. No additional conversion is needed since the 03.46+ already is on an IP format. It also facilitates an evolution from 03.46+ to alternative instances of T.38, thus benefiting from the wider market that the Internet constitutes and its possibly cheaper and better products.

30

The solution can also be adopted to packet switched transmission in the mobile network.

1. Method for providing non-transparent fax services in a
5 mobile network,
c h a r a c t e r i s e d i n that the mobile network
is provided with an IP layer for transporting the fax
messages, which fax messages are transported according to
ITU-T protocols T.4 and T.30 whereupon the messages are
10 mapped onto TCP or UDP packets according to the ITU-T T.38
protocol, which in turn are mapped onto RLP frames.

2. Arrangement according to claim 1,
c h a r a c t e r i s e d i n that the in order to
15 handle long delays and avoid errors, the fax messages are
transmitted according to the principles outlined in GSM
Technical Specification 03.46 or other similar principles
such as those outlined in 3G Technical Specification
23.146.

3. Method according to claim 1 or 2,
c h a r a c t e r i s e d i n that TCP/IP header
compression is applied.

4. Method according to claim 3,
c h a r a c t e r i s e d i n that mapping of IP
packets onto RLP frames is performed by transporting the IP
packets on an asynchronous connection using the Point to
Point protocol (PPP) [as specified in IETF RFC 1661 and
25 1662] between the Mobile Station (MS) and the Interworking
Function (IWF).
30

5. System for providing non-transparent fax services in a
mobile network,
35 c h a r a c t e r i s e d i n that the mobile network
is provided with an IP layer for transporting the fax
messages, which fax messages are transported according to

ITU-T protocols T.4 and T.30 whereupon the messages are mapped onto TCP or UDP packets according to the ITU-T T.38 protocol, which in turn are mapped onto RLP frames.

5 6. System according to claim 5,
c h a r a c t e r i s e d i n that in order to handle
long delays and avoid errors, the fax messages are trans-
mitted according to the principles outlined in GSM
Technical Specification 03.46 or other similar principles
10 such as those outlined in 3G Technical Specification
23.146.

7. System according to claim 5 or 6,
c h a r a c t e r i s e d i n that TCP/IP header
15 compression is applied.

8. System according to claim 7,
c h a r a c t e r i s e d i n that mapping of IP
packets onto RLP frames is performed by transporting the IP
20 packets on an asynchronous connection using the point to
Point protocol (PPP) [as specified in IETF RFC 1661 and
1662] between the Mobile Station (MS) and the Interworking
Function (IWF).

25 9. System according to claim 5 or 8,
c h a r a c t e r i s e d i n that the mobile network
is provided with a fax gateway, which may be placed in a
Mobile Switching Centre (MSC) or separated from the MSC by
an IP network, and which fax gateway is compliant with T.38
30 terminology.

10. System according to any of the claims 5-9,
c h a r a c t e r i s e d i n that the system can be
adapted to packet switched transmission in the mobile
35 network.

11. Fax terminal for use in a system according to any of
the claims 5-10, on the mobile station side,

c h a r a c t e r i s e d i n a first interface between a standard fax machine and an adapter and a second asynchronous V.24 interface between the adapter and the Terminal Adapter Function (TAF).

5

12. Fax terminal according to claim 11,
c h a r a c t e r i s e d i n that the fax machine and the adapter are bundled into one product, a so-called Internet Aware Facsimile Device (IAFD).

10

13. Fax terminal according to claim 12,
c h a r a c t e r i s e d i n that said Internet Aware Facsimile Device (IAFD) is arranged as a special purpose fax machine.

15

14. Fax terminal according to claim 11,
c h a r a c t e r i s e d i n that said Internet Aware Facsimile Device (IAFD) is arranged as a PC-like device.

20

15. Fax terminal according to claim 14,
c h a r a c t e r i s e d i n that said adapter is in form of downloadable software.

S a m m e n d r a g

The present invention relates to an arrangement and a method for providing fax service for mobile networks. Fax messages are transported over an additional IP layer in the mobile network. The messages are mapped onto TCP or UDP packets, which in turn are mapped onto RLP frames for transport on the mobile network.

Figure 1

Figure 1

5

10

15

Figure 2 Fax Gateway separated from MSC by an IP network.

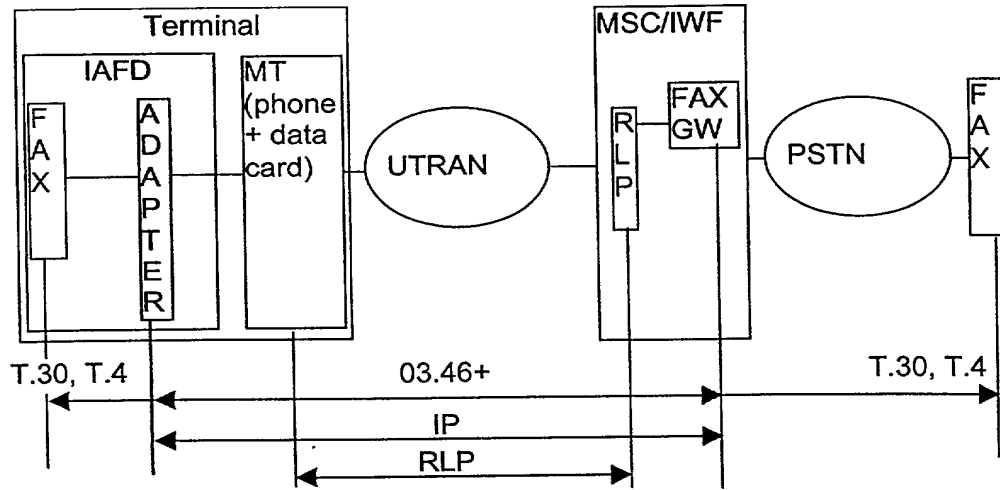


Figure 1

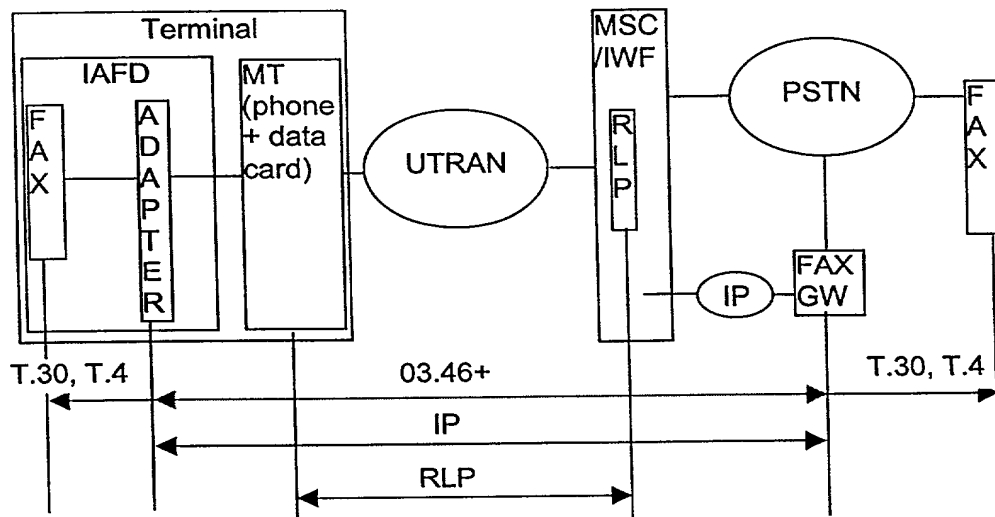


Figure 2

**COMBINED DECLARATION AND POWER OF ATTORNEY
FOR UTILITY PATENT APPLICATION**

Attorney's Docket No.

032292-020

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I BELIEVE I AM THE ORIGINAL, FIRST AND SOLE INVENTOR (if only one name is listed below) OR AN ORIGINAL, FIRST AND JOINT INVENTOR (if more than one name is listed below) OF THE SUBJECT MATTER WHICH IS CLAIMED AND FOR WHICH A PATENT IS SOUGHT ON THE INVENTION ENTITLED:

FACSIMILE SERVICES IN MOBILE NETWORKS

the specification of which

(check one)

☒ is attached hereto;

☐ was filed on _____ as

Application No. _____

and was amended on _____;
(if applicable)

I HAVE REVIEWED AND UNDERSTAND THE CONTENTS OF THE ABOVE-IDENTIFIED SPECIFICATION, INCLUDING THE CLAIMS, AS AMENDED BY ANY AMENDMENT REFERRED TO ABOVE;

I ACKNOWLEDGE THE DUTY TO DISCLOSE TO THE OFFICE ALL INFORMATION KNOWN TO ME TO BE MATERIAL TO PATENTABILITY AS DEFINED IN TITLE 37, CODE OF FEDERAL REGULATIONS, Sec. 1.56 (as amended effective March 16, 1992);

I do not know and do not believe the said invention was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said application; that said invention was not in public use or on sale in the United States of America more than one year prior to said application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on any application filed by me or my legal representatives or assigns more than twelve months prior to said application;

I hereby claim foreign priority benefits under Title 35, United States Code Sec. 119 and/or Sec. 365 of any foreign application(s) for patent or inventor's certificate as indicated below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application(s) on which priority is claimed:

COMBINED DECLARATION AND POWER OF ATTORNEY

Attorney's Docket No.

032292-020

COUNTRY/INTERNATIONAL	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED
Norway	19992775	8 June 1999	YES <u>X</u> NO <u> </u>
			YES <u> </u> NO <u> </u>

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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